

Annual Seabird Bycatch Estimates for 2006  
Alaska Fisheries Science Center Seabird Coordinated Studies.

**BACKGROUND:** This document reports the seabird bycatch that occurred in the Alaskan groundfish fisheries during 2006. Gear types included are demersal longline, groundfish trawl, and groundfish pot. Estimates do not include the directed Pacific Halibut demersal longline fishery, crab pot, salmon fisheries (gillnet, purse seine, troll), herring fisheries, and other non-groundfish or state-managed fisheries that operate in Alaskan Waters. A more extensive report that shows seabird bycatch in Alaskan Groundfish Fisheries from 1993 to 2004 by gear type and region and also provides other information is available on the Alaska Fisheries Science Center (AFSC) website seabird page <http://www.afsc.noaa.gov/refm/reem/Seabirds/Default.php> ). Species scientific names for birds and fish are listed in Table 1.

Methods used in the collection of seabird bycatch information on board commercial fishing vessels, the collection of commercial catch information, and analysis procedures that incorporated these two data sets were described in the report on the 2005 bycatch (available at the AFSC seabird website noted above). It is worth restating here that Observer sampling on demersal longline and groundfish trawl vessels could be subjected to potential biases. On demersal longline vessels, seabirds are caught during the set process and pulled to the bottom where the gear soaks for some period of time before being hauled back. Observers sample longlines during the haul. Counts of bycaught seabirds do include those that drop off the gear alongside the vessel during the haulback but do not include any birds that fall off or are somehow removed from the gear prior to the hooks reaching the surface. To date, no studies that we are aware of describe underwater drop-off rates of demersal fishing gear.

On trawl vessels, birds may interact with gear in several ways that could cause mortality. These include being caught while the net is being deployed or retrieved, caught while the net is actively being fished (not likely for surface-feeding birds such as fulmars and albatross), collisions with heavy trawl door cables, or in some fisheries (such as midwater trawl) colliding with the trawl sonar cable. Observers stationed on trawl vessels work below decks, sampling the catch as it is moved from the fish bins to the fish processing area. Seabird mortalities have been documented from these other sources where the birds were not part of the actual catch (i.e., not included in the codend and therefore not dumped into the fish bins).

**REGIONS:** Seabird bycatch are summed by NMFS statistical area and reported here by the broad geographical regions that constitute Alaskan waters where the groundfish fisheries operate. The regions reported for demersal longline (Table 2) and groundfish trawl (Table 4) fisheries are the Aleutian Islands, Bering Sea, and Gulf of Alaska. In the Fishery Management Plans (FMP's) the Gulf of Alaska is managed as one FMP while the Bering Sea and Aleutian Islands are managed together in an FMP. These regions do, however, align closely with the distinct large marine ecosystems of Alaskan waters (Aydin et al., 2007) so seabird bycatch is reported by region. Maps of these Regions and NMFS statistical areas can be found at <http://www.fakr.noaa.gov/rr/figures.htm> .

**TARGET:** To provide a better idea of the differences between fisheries, seabird bycatch is also reported here by fishery target for the demersal longline (Table 3) and the groundfish trawl (Table 5) fisheries. For this report, targets are calculated by the predominate species in the

fishing operation as sampled by the observer or reported by a processor. The demersal longline table includes the target Pacific Halibut. These are hauls that were predominately halibut from cruises where the observer was stationed on board because the vessel had both sablefish and halibut Individual Fishing Quota. No directed halibut cruises are represented here and the numbers do not represent actual seabird bycatch in the halibut fishery.

ANNUAL ESTIMATES: A summary of the cumulative seabird bycatch estimates across all fisheries, by species or species group, is provided in Table 6. The total estimated take of seabird for all fisheries combined in Alaskan waters during 2006 was 7,633 birds. The total combined (all Alaska) estimated seabird take in the 2006 demersal longline fishery was 4,531 birds, a 29% reduction from the 6,370 birds taken in 2005 and also 9% lower than the 2004 estimated take of 4,979 seabirds. The 5-year average of 2002 through 2006 is 5,138 birds. This represents a period when there was extensive use of paired streamer lines within the fleet. Many freezer longline operators began voluntarily deploying paired streamer lines in 2002 prior to February of 2004 when paired streamer lines were required for all vessels over 55 feet. During the period prior to vessels deploying streamer lines as a seabird mitigation measure (1993 to 2000) the annual average estimated seabird bycatch was 16,507. The implementation of streamer lines as a seabird mitigation measure appears to have resulted in a 68.9% overall reduction in seabird bycatch in the Alaskan demersal groundfish fishery.

The 2006 estimate is also well below the overall 1993 through 2005 average of 13,647. In the demersal longline fishery, 47.7% of the bycatch was gull species, followed by Northern fulmars (32.1%), shearwater species (9.5%), and unidentified birds (6.3%). Northern fulmars typically constitute the greatest proportion of the seabird bycatch although gulls were taken in the greatest proportion this year and in 2002. The 191 albatrosses estimated taken accounted for 4.2% of the overall seabird bycatch in this fishery. Albatross bycatch in the 2006 demersal longline fleet was higher than the 126 albatross taken in 2005 and the 158 taken in 2004. The Pacific cod fleet accounted for 79.4% of the overall seabird bycatch and 15.7% of the estimated albatross take. The IFQ sablefish fishery, while only accounting for 14.2% (up from 6.0% in 2005) of the overall seabird bycatch, accounted for 78.5% (up from 49.2%) of the total albatross bycatch.

In the trawl fishery, the estimated seabird bycatch was 2,872 (all species, all areas combined). This is an 84% increase from the estimated take of 1,562 birds in 2005 and about 4 times the 2004 estimate of 714 birds. The trawl 5-year average (2002 through 2006) is 1,363 birds. Due to changes in observer data collection protocols we cannot apply a comparable estimation procedure to the overall 1993 through 2006 average. In the 2006 trawl fisheries, the unidentified seabird category accounted for most of the seabird bycatch (72.8%) with an estimated take of 2,092 birds. This was followed by Northern fulmars with 425 birds (14.8%), gull species with 199 birds (6.4%), and shearwater species with 147 birds (5.1%). The 2006 trawl fleet estimated albatross bycatch was only 4 albatross: 2 Laysan and 2 unidentified. The 2 Laysan occurred in the Pollock fishery while the unidentified albatross occurred in the Pacific cod fishery. The Pacific cod fishery accounted for the highest number of seabirds within the trawl fleet, with 2,175 birds and 75.7% of the total. The bulk of the unidentified birds occurred in this fishery (2,086). The Pollock fleet accounted for 368 birds representing 12.8% of the total, with mostly Northern fulmars (355). This was a reverse from 2005 where the pollock fishery accounted for 61.7% of the seabird take and the cod fishery accounted for 8.9% of the total.

There were several notable differences in the estimated numbers of birds taken between 2006 and 2005. The large increase in the estimated take was primarily due to the large increase in

unidentified seabirds. This large increase (there was only 1 unidentified bird observed in 2005, with an estimate of 3 fleetwide) was due primarily to a single haul in the Pacific Cod fishery where 23 birds were counted during a basket sample resulting in an estimate of 2,086 birds. This event occurred in NMFS statistical area 517 in the Bering Sea. The bycatch of alcids dropped to just a few birds (3), contrary to 2005 which was an unusual year with an abnormally high estimated take of 833 alcids. The overall annual average bycatch of alcids from 2002 through 2006 is 216. There were two albatross (one Laysan, one unidentified) observed taken in the trawl fleet in 2006 resulting in a total estimated take of 4 birds. There were 56 Laysan albatross estimated taken in the combined trawl fleet in 2005.

Groundfish pot fisheries in Alaska take very few birds. In 2006 there were an estimated 219 Northern fulmars, 7 shearwaters, and 4 “other species” taken in this fishery for a total of 230 birds overall. The 4 other species were storm petrels. Northern fulmars and storm petrels are surface feeders, and although shearwaters dive they typically are relatively shallow divers especially as compared to the depths that pots are fished. Therefore, these bycatch estimates may well represent cases where birds collided with pots on deck, somehow got inside, and were subsequently set with the pot. The 2002 through 2006 average is 116 birds, while the overall 1993 to 2006 average is 73 birds per year.

ALBATROSS BYCATCH: The total estimated bycatch of all albatross, for all groundfish fisheries, was 195 (Table 6). This represents a small increase from the 182 albatross taken in 2005. The demersal longline fishery bycatch of Laysan albatross decreased from 83 in 2005 to 57 in 2006 (both below the 120 in 2004). Because the trawl fishery estimate was only 2 Laysan, the overall combined take of Laysan albatross decreased to 59, as opposed to 139 in 2005, and 120 in 2004. (no albatross were observed taken in the 2004 trawl fishery). This trend is opposite for black-footed albatross. In the demersal longline fishery the estimated bycatch of black footed albatross was 134 in 2006, up from 43 black-footed albatross estimated taken in 2005, and 35 in 2004. Most of this take occurred in the Gulf of Alaska and in the sablefish IFQ fleet. No black-footed albatross have been observed taken in any of the Alaskan trawl fisheries, 1993-2006. In 2006 there were 2 unidentified albatross, compared to none in 2005 and an estimated 3 in 2004.

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Citation:

Aydin, K., S. Gaichas, I. Ortiz, D. Kinsey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298 p.

Table 1. Species names and species group categories used in the text and Tables 1 through 4.

Species/species Group	Includes	Scientific Name
<b>Seabirds</b>		
Short-tailed Albatross	n/a	<i>Phoebastria albatrus</i>
Laysan Albatross	n/a	<i>Diomedea immutabilis</i>
Black-footed Albatross	n/a	<i>Diomedea nigripes</i>
Unidentified Albatross	Short-tailed, Laysan, or black-footed.	n/a
Northern Fulmar	n/a	<i>Fulmarus glacialis</i>
Shearwaters	Unidentified Shearwater	<i>Puffinus</i> spp
	Sooty Shearwater	<i>Puffinus griseus</i>
	Short-tailed shearwater	<i>Puffinus tenuirostris</i>
Unidentified Procellarid	All of the above	Procellariiformes
Gull	Unidentified gulls	<i>Laridae</i>
	Herring gulls	<i>Larus argentatus</i>
	Glaucous gulls	<i>Larus hyperboreus</i>
	Glaucous-winged gulls	<i>Larus glaucescens</i>
Alcid	Unidentified alcids,	<i>Alcidae</i>
	Guillemots	<i>Cepphus</i> spp.
	Murres	<i>Uria</i> spp.
	Puffins	<i>Fratruncula</i> spp.
	Murrelets and auklets	Several genera
Other Seabird	Miscellaneous birds – could include:	
	Loons	<i>Gaviidae</i>
	Grebes	<i>Podicipedidae</i>
	Cormorants	<i>Phalacrocoracidae</i>
	Seaducks	<i>Anatidae</i>
	Jaeger/skuas	<i>Stercorariidae</i>
	Kittiwakes	<i>L. tridactyla</i> , <i>L. brevirostris</i>
	Terns	<i>Sternidae</i>
	Storm petrels	<i>Oceanitidae</i>
Unidentified Seabird	All of the above	
<b>Fish</b>		
Pacific Cod	n/a	<i>Gadus macrocephalus</i>
Pacific Halibut	n/a	<i>Hippoglossus stenolepis</i>
Rockfish	Several species, primarily	<i>Sebastes</i> spp.
	Pacific Ocean Perch	<i>Sebastes alutus</i>
Sablefish	Northern Rockfish	<i>Sebastes polyspinis</i>
	n/a	<i>Anoplopoma fimbria</i>
Greenland Turbot	n/a	<i>Reinhardtius hippoclossoides</i>
Atka Mackerel	n/a	<i>Pleurogrammus monopterygius</i>
Flatfish	Several species and species complexes (i.e., deep water flatfish)	Pleuronectiformes
	including: Yellowfin Sole	<i>Limanda aspera</i>
	Rock Sole (Northern and Southern)	<i>Lepidopsetta polyxystra</i> and <i>L. bilineata</i>
Walleye Pollock	n/a	<i>Theragra chalcogramma</i>

Table 2. Seabird bycatch estimates for the 2006 Alaskan groundfish demersal longline fishery by Region. Estimates are based on data provided by North Pacific Groundfish Observers<sup>1</sup> while monitoring vessels  $\geq 60$  feet length overall. Numbers in parentheses are the 95% confidence intervals. The total effort in 2006 was 265,431,600 hooks resulting in a catch rate of 0.017 birds per 1,000 hooks.

Species/ Species Group	Region			Total (All Alaska Combined)
	Aleutian Islands	Bering Sea	Gulf Of Alaska	
Short-tailed Albatross	0	0	0	0
Laysan Albatross	44 (24--82)	3 (3—3)	10 (3—32)	57 (33—97)
Black-footed Albatross	3 (1—12)	5 (1—24)	126 (54--298)	134 (60-303)
Unidentified Albatross	0	0	0	0
Northern Fulmar	89 (55--144)	1,154 (917—1,452)	212 (120--374)	1,455 (1,186—1,782)
Shearwater spp.	0	424 (331--541)	5 (1-20)	429 (336--546)
Unidentified Procellarids	0	0	0	0
Gull spp.	45 (25--81)	1,692 (1,002—2,858)	423 (208--859)	2,160 (1,396-3,343)
Alcid spp.	0	6 (1--28)	0	6 (1—28)
Other Species	0	5 (1-23)	0	5 (1-23)
Unidentified Seabirds	0	245 (183--327)	40 (14--116)	285 (212--383)
<b>Total Birds</b>	<b>181 (132--248)</b>	<b>3,534 (2,706—4,615)</b>	<b>816 (531--1,252)</b>	<b>4,531 (3,624—5,661)</b>

<sup>1</sup> Observers record all birds hooked on gear within the sample regardless of whether the bird was landed or fell off the gear alongside the vessel (dropoff).

Table 3. Seabird bycatch estimates for the 2006 Alaskan groundfish demersal longline fishery by target fishery. Estimates are based on data provided by North Pacific Groundfish Observers while monitoring vessels  $\geq 60$  feet length overall. Numbers in parentheses are the 95% confidence intervals. Targets are based on the predominate species in the catch.

Species/ Species Group	Target Fishery										All Targets Combined		
	Pacific Cod		Pacific Halibut		Rockfish		Sablefish		Greenland Turbot			Misc. Targets	
Short-tailed Albatross	0		0		0		0		0		0	0	
Laysan Albatross	25	(12 -- 55)	4	(1 – 15)	0		25	(10 – 58)	3	(3 – 3)	0	57	(33 – 97)
Black- footed Albatross	5	(1 – 24)	4	(1 – 16)	0		125	(53 – 297)	0		0	134	(60 – 303)
Unidentified Albatross	0		0		0		0		0		0	0	
Northern Fulmar	1,044	(828 – 1,317)	30	(12 – 73)	0		142	(82 – 246)	239	(13--437)	0	1,455	(1,186 – 1,782)
Shearwater species	424	(331 – 541)	0		0		5	(1 – 20)	0		0	429	(336 – 546)
Unidentified Procellarids	0		0		0		0		0		0	0	
Gull Species	1,808	(1,104 – 2,961)	8	(3 – 24)	3	(3 – 3)	341	(146 – 795)	0		0	2,160	(1,396 – 3,343)
Alcid Species	6	(1 – 28)	0		0		0		0		0	6	(1 – 28)
Other Species	5	(1 – 23)	0		0		0		0		0	5	(1 – 23)
Unidentifd Seabirds	279	(206 – 377)	2	(1 – 8)	0		4	(1 – 18)	0		0	285	(212 – 383)
<b>Total</b>	<b>3,596</b>	<b>(2,768 – 4,672)</b>	<b>48</b>	<b>(25 – 89)</b>	<b>3</b>	<b>(3 – 3)</b>	<b>642</b>	<b>(386 – 1,067)</b>	<b>242</b>	<b>(133--439)</b>	<b>0</b>	<b>4,531</b>	<b>(3,624 – 5,661)</b>

Table 4. Seabird bycatch estimates for the 2006 Alaskan groundfish trawl fisheries by region. Estimates are based on data provided by North Pacific Groundfish Observers while monitoring vessels  $\geq 60$  feet length overall<sup>1</sup>. Numbers in parentheses are the 95% confidence intervals. The total groundfish catch in 2006 was 2,018,774.9 mt. The overall catch rate was 1.42 birds per 1,000 mt.

Species/ Species Group	Region			Gulf Of Alaska	Total (All Alaska Combined)	
	Aleutian Islands	Bering Sea				
Short-tailed Albatross	0	0		0	0	
Laysan Albatross	0	2	(1 – 34)	0	2	(1 – 34)
Black-footed Albatross	0	0		0	0	
Unidentified Albatross	2	(1 – 119)	0	0	2	(1 – 119)
Northern Fulmar	8	(2 – 226)	417	(245 – 711)	0	425 (247 – 733)
Shearwater spp.	127	(25 – 646)	20	(12 – 35)	0	147 (34 – 633)
Unidentified Procellarids	0		2	(1 – 5)	0	2 (1 – 5)
Gull spp.	0		199	(39 – 1,013)	0	199 (39 – 1,013)
Alcid spp.	0		3	(1 – 12)	0	3 (1 – 12)
Other Species	0		0		0	0
Unidentified Seabirds	0		2,092	(411 – 10,645)	0	2,092 (411 – 10,645)
Total Birds	137	(28 – 670)	2,735	(722 – 10,365)	0	2,872 (797 – 10,358)

<sup>1</sup> Estimates are derived from observer sampling of landed catch and do not include seabird mortalities from other sources such as interactions or entanglements with trawl cables or third wires.

Table 5. Seabird bycatch estimates for the 2006 Alaskan groundfish trawl fisheries by target fishery. Estimates are based on data provided by North Pacific Groundfish Observers while monitoring vessels  $\geq 60$  feet length overall<sup>1</sup>. Numbers in parentheses are the 95% confidence intervals.

Species/ Species Group	Target Fishery											
	Atka Mackerel		Pacific Cod		Flatfish		Rockfish		Pollock		Misc. Targets	All Targets Combined
Short-tailed Albatross	0		0		0		0		0		0	
Laysan Albatross	0		0		0		0		2	(1 – 34)	0	2 (1 – 34)
Black-footed Albatross	0		0		0		0		0		0	0
Unidentified Albatross	0		2	(1 – 119)	0		0		0		0	2 (1 – 119)
Northern Fulmar	0		87	(13 – 612)	3	(1 – 194)	0		335	(286 – 393)	0	425 (247 – 733)
Shearwater species	127	(25 – 646)	0		0		0		20	(12 – 35)	0	147 (34 – 633)
Unidentified Procellarids	0		0		0		0		2	(1 – 5)	0	2 (1 – 5)
Gull Species	0		0		199	(39 – 1,013)	0		0		0	199 (39 – 1,013)
Alcid Species	0		0		0		0		3	(1 – 12)	0	3 (1 – 12)
Other Species	0		0		0		0		0		0	0
Unidentifid Seabirds	0		2,086	(409 – 10,650)	0		0		6	(2 – 16)	0	2,092 (411 – 10,645)
<b>Total</b>	<b>127</b>	<b>(25 – 646)</b>	<b>2,175</b>	<b>(447 – 10,592)</b>	<b>202</b>	<b>(40 – 1,024)</b>	<b>0</b>		<b>368</b>	<b>(316 – 427)</b>	<b>0</b>	<b>2,872 (797 – 10,358)</b>

<sup>1</sup> Estimates are derived from observer sampling of landed catch and do not include seabird mortalities from other sources such as interactions or entanglements with trawl cables or third wires.

Table 6. Total Seabird bycatch estimates for the 2006 Alaskan groundfish fisheries, demersal longline, pot, and trawl combined. Estimates are based on data provided by North Pacific Groundfish Observers while monitoring vessels  $\geq 60$  feet length overall.

Species/ Species Group	Fishery			Total (All Fisheries Combined)	Species Group % of Total
	Longline	Pot	Trawl		
Short-tailed Albatross	0	0	0	0	0
Laysan Albatross	57	0	2	59	0.77
Black-footed Albatross	134	0	0	134	1.76
Unidentified Albatross	0	0	2	2	<0.5
Albatross subtotal	191	0	4	195	2.55
Northern Fulmar	1,455	219	425	2,099	27.50
Shearwater spp.	429	7	147	583	7.64
Unidentified Procellarids	0	0	2	2	<0.5
Gull spp.	2,160	0	199	2,359	30.91
Alcid spp.	6	0	3	9	<0.5
Other Species	5	4	0	9	<0.5
Unidentified Seabirds	285	0	2,092	2,377	31.14
Total Birds	4,531	230	2,872	7,633	